

BEFORE THE POWER SITING BOARD OF THE STATE OF OHIO

**In the Matter of the Application of Black Fork Wind
Energy, LLC for a Modification to its Certificate Issued
in Case No. 10-2865-EL-BGN.**) Case No. 17-1148-EL-BGA)

Members of the Board:

Chairman, Public Utilities Commission	Ohio House of Representatives
Director, Development Services Agency	Ohio Senate
Director, Department of Health	
Director, Department of Agriculture	
Director, Environmental Protection Agency	
Director, Department of Natural Resources	
Public Member	

To the Honorable Power Siting Board:

Please review the attached Staff Report of Investigation, which has been filed in accordance with Ohio Power Siting Board rules. The application in this case is subject to an approval process as required by Section 4906.03 of the Ohio Revised Code.

Sincerely,

RAS

Patrick Donlon
Director, Rates and Analysis
Public Utilities Commission of Ohio

OPSB STAFF REPORT OF INVESTIGATION

Case Number: 17-1148-EL-BGA (associated with prior case numbers 10-2865-EL-BGN and 14-1591-EL-BGA)

Project Name: Black Fork Wind Energy Project

Project Location: Crawford and Richland counties

Applicant: Black Fork Wind Energy, LLC

Application Filing Date: June 6, 2017

Report Date: November 13, 2017

Applicant's Waiver Requests: None

Staff Assigned: J. Pawley, M. Bellamy, A. Conway

Background to the Application

On January 23, 2012, in Case No. 10-2865-EL-BGN, the Ohio Power Siting Board (Board) authorized Black Fork Wind Energy, LLC (the Applicant) to construct, operate, and maintain a wind-powered electric generation facility consisting of up to 91 wind turbines, with a maximum nameplate capacity of 200 megawatts (MW) (Original Certificate). On March 24, 2016, the Board granted the Applicant's request to extend the term of the Original Certificate from January 23, 2017 to January 23, 2019.

On September 12, 2014, in Case No. 14-1591-EL-BGA, the Applicant filed an application to add two turbine models for potential operation: the Vestas V110 (2.0 MW), and the General Electric (GE) 2.3-107 (2.3 MW) (the 14-1591-EL-BGA Application). The application also considered two different tower designs for both the Vestas V110 turbine model and the GE 2.3-107 turbine model. The different tower designs resulted in the Vestas V110 turbine model with a hub height of either 80 or 95 meters (m), and the GE 2.3-107 turbine model with a hub height of either 80 m or 94 m. On August 27, 2015, the Board approved the application.

The turbine manufacturers and models approved for this project through the Original Certificate and the 14-1591-EL-BGA Application are described in the table below.

Case Number	Turbine Model
10-2865-EL-BGN	Vestas V100 (1.8 MW) (80 m hub height)
	Vestas V100 (1.8 MW) (95 m hub height)
	GE 1.6 XLE (1.6 MW) (80 m hub height)
	GE 1.6 XLE (1.6 MW) (100 m hub height)
	Siemens SWT-2.3-101 (2.3 MW) (80 m hub height)
	Siemens SWT-2.3-101 (2.3 MW) (100 m hub height)
14-1591-EL-BGA	Vestas V110 (2.0 MW) (80 m hub height)
	Vestas V110 (2.0 MW) (95 m hub height)
	GE 2.3-107 (2.3 MW) (80 m hub height)
	GE 2.3-107 (2.3 MW) (94 m hub height)

Application Description

In the present application, the Applicant proposes to add a Vestas V110 (2.2 MW) turbine model to the approved turbine model list at both the 80 m and 95 m hub height. The Applicant states that the previously approved Vestas V110 2.0 MW model and the currently proposed Vestas V110 (2.2 MW) turbine model are physically identical, meaning the tower heights and rotor diameters are the same. Additionally, the Applicant is seeking to extend the Original Certificate, a second time, to January 23, 2020.

The Applicant is not proposing to revise the location of any turbine or associated facility through this application. Additionally, the overall facility maximum nameplate capacity of 200 MW approved in the Original Certificate would remain the same. As such, Staff's review of the Applicant's request is solely focused on this proposed turbine model and whether its addition to the list of acceptable turbine models for this project (at either an 80 m hub height or a 95 m hub height) would impact any of the stipulated conditions or result in a material increase in environmental impact as compared to the previously certificated project.

Application Review

Turbine Model Upgrades

The Board previously certificated the Applicant's use of the Vestas V110 (2.0 MW) turbine model (at both the 80 m and 95 m hub height), which has a lower capacity, but identical dimensions to the turbine model proposed in the present application. The dimensions of this turbine model and all other previously approved turbine models are detailed in the following table.

	Turbine Model	Rotor Diameter (feet)	Total Height (feet)
Approved	Vestas V100 (1.8 MW) (80 m hub height)	328	426
	Vestas V100 (1.8 MW) (95 m hub height)	328	476
	GE 1.6 XLE (1.6 MW) (80 m hub height)	328	426
	GE 1.6 XLE (1.6 MW) (100 m hub height)	328	492
	Siemens SWT-2.3-101 (2.3 MW) (80 m)	331	428
	Siemens SWT-2.3-101 (2.3 MW) (100 m)	331	494
	Vestas V110 (2.0 MW) (80 m hub height)	361	443
	Vestas V110 (2.0 MW) (95 m hub height)	361	492
	GE 2.3-107 (2.3 MW) (80 m hub height)	351	438
	GE 2.3-107 (2.3 MW) (94 m hub height)	351	484
Proposed	Vestas V110 (2.2 MW) (80 m hub height)	361	443
	Vestas V110 (2.2 MW) (95 m hub height)	361	492

Applicable to the Original Certificate, 750 feet in horizontal distance from the tip of the turbine's nearest blade at 90 degrees to the exterior of the nearest, habitable residential structure is the minimum distance a turbine is authorized to be located in proximity to a habitable structure on an adjacent property, without property owner approval. Likewise, applicable to the Original Certificate, without property owner approval, the minimum property line setback is equal to a horizontal distance, from the turbine's base to the property line of the wind farm property, equal

to one and one-tenth times the total height of the turbine structure, as measured from its base to the tip of its highest blade.

Applying the minimum setback requirements of the Original Certificate to the dimensions of each turbine model led to Staff's calculation of the following residential and property line setback distances.

	Turbine Model	Residential Setback (feet)	Property Line Setback (feet)
Approved	Vestas V100 (1.8 MW) (80 m hub height)	914	469
	Vestas V100 (1.8 MW) (95 m hub height)	914	523
	GE 1.6 XLE (1.6 MW) (80 m hub height)	914	469
	GE 1.6 XLE (1.6 MW) (100 m hub height)	914	541
	Siemens SWT-2.3-101 2.3 MW) (80 m)	916	471
	Siemens SWT-2.3-101 (2.3 MW) (100 m)	916	543
	Vestas V110 (2.0 MW) (80 m hub height)	930	487
	Vestas V110 (2.0 MW) (95 m hub height)	930	541
	GE 2.3-107 (2.3 MW) (80 m hub height)	926	482
	GE 2.3-107 (2.3 MW) (94 m hub height)	926	532
Proposed	Vestas V110 (2.2 MW) (80 m hub height)	930	487
	Vestas V110 (2.2 MW) (95 m hub height)	930	541

The Applicant states that it has applied a 1,250 feet self-imposed setback from residential structures and that all turbine locations as currently certificated comply with this self-imposed residential structure setback. Staff notes, consistent with the Original Certificate, if the location of a wind turbine does not meet the required setback, it may not be constructed unless the Applicant secures appropriate executed waiver(s) of the minimum setback requirement.

Wind Velocity

Wind turbines are designed to withstand high wind speeds. Staff reviewed the safety features of the Vestas V110 (2.2 MW) turbine model and its ability to withstand high winds in the previously certificated project and the present application.

The Applicant states that the turbines have the following safety features in the event of high winds: a supervisory control and data acquisition control system to monitor weather, anemometers on each turbine, two independent braking systems, and an automatic turbine shut down mechanism at excessive wind speeds or vibrations. Installing and utilizing these safety control mechanisms minimizes potential impacts from high winds.

In relation to wind velocity, the proposed additional turbine model would not pose any material increase in environmental impacts as compared to the previously certificated project. Conditions 38, 41, 42, and 43 of the Original Certificate, as modified by the 14-1591-EL-BGA Application, adequately address potential wind speed-related safety considerations relative to the proposed turbine model.

Foundations

Because the locations and maximum dimensions of the proposed wind turbines would not change, the proposed addition of this turbine model would not create further effects on final turbine foundation design and would therefore not pose any material increase in environmental impacts as compared to the previously certificated project. Condition 33 of the Original Certificate, as modified by the 14-1591-EL-BGA Application, adequately addresses foundations.

Pipeline Protection

Staff has found that since the time the Board issued the Original Certificate, Energy Transfer Partners began constructing a pipeline in the area. Energy Transfer Partners estimates that the pipeline will be placed in service in by the end of the first quarter of 2018.¹ The Applicant has provided a map of the pipeline in relation to the wind farm and asserts that the pipeline would be greater than 1.1 times the total turbine height of the tallest turbine (541 feet) from the base of any turbine.

In the Original Certificate, Staff recommended a minimum setback distance from gas pipelines of at least one and one-tenth times the total height of the turbine structure in order to protect pipelines from potential issues. Because the locations and maximum dimensions of the proposed wind turbines would not change, the proposed addition of this turbine model would not create further effects on pipelines and would therefore not pose any material increase in environmental impacts as compared to the previously certificated project. Conditions 39 and 40 of the Original Certificate, as modified by the 14-1591-EL-BGA Application, adequately address pipeline protection issues.

Safety Manual

The Applicant is required to provide the generation equipment manufacturer's safety standards, such as a safety manual or similar document. Staff reviewed the safety manual for the proposed turbine model. Staff reviews this safety information to ensure safety requirements or recommendations are and would be upheld by the wind farm owner/operator and for inclusion in the wind farm operator's overall safety culture. The Applicant reiterated that it will adhere to Condition 38 from the Original Certificate, which requires its compliance with the turbine manufacturer's most current safety manual and maintain it onsite.

In relation to the safety manual, the proposed additional turbine model would not pose any material increase in environmental impacts as compared to the previously certificated project. Conditions 38, 41, 42, and 43 of the Original Certificate, as modified by the 14-1591-EL-BGA Application, adequately address the potential safety considerations relative to the proposed turbine model.

Blade Shear and Ice Throw

Blade shear occurs when a wind turbine blade, or segment, separates from the rotor and is thrown or dropped from the tower. Ice throw occurs when accumulated ice on the wind turbine blades separates from the blade and falls, or is thrown, from the blade.

Staff reviewed the potential for blade shear and ice throw in the Original Certificate, the 14-1591-EL-BGA Application, and the present application. Staff determined that the range of potential blade velocities and cut-out speeds for both the certificated and the proposed turbine

1. Energy Transfer Partners, L.P., "Rover Pipeline Facts," accessed October 24, 2017, <http://www.roverpipelinefacts.com>.

model are the same, thereby resulting in similar probabilities for blade shear and ice throw associated with this turbine model at both a 2.0 MW and a 2.2 MW capacity.

In relation to the blade shear and ice throw, the proposed additional turbine model would not pose any material increase in environmental impacts as compared to the previously certificated project. Conditions 43 and 44 of the Original Certificate, as modified by the 14-1591-EL-BGA Application, adequately address the potential blade shear and ice throw impacts of the proposed turbine model.

Noise

Noise will be generated during both construction and operation of the wind farm facility. Construction noise will be associated with construction equipment and construction procedures that are common to many large-scale construction activities. However, Staff believes that the adverse impact of this noise will be minimal because of the transient nature of the construction activities, the distance of the activities from most residential structures, the limitation of construction activities to normal daytime working hours, and noise mitigation that has been proposed in the application.

During facility operation, noise will be associated with the nacelle and turbine blades when the units are generating electricity. Staff reviewed the potential noise impacts in the Original Certificate, the 14-1591-EL-BGA Application and the present application. The noise study model in the 14-1591-EL-BGA Application showed that the Vestas V110 (2.0MW) is modeled to impact 13 non-participating residences at sound levels greater than the ambient nighttime noise level plus five decibels (dBA). The Applicant has committed to adhering to Condition 51 of the Original Certificate, which requires the Applicant to show, prior to construction, that zero non-participating residences are modeled to receive sound levels exceeding the ambient nighttime noise level plus five dBA. Furthermore, the Applicant stated, and Staff determined, that the Vestas V110 (2.2MW) turbine model has lower sound power output levels at all wind speeds than the Vestas V110 (2.0 MW) version.

Therefore, in relation to noise impact, the proposed additional turbine model would not pose any material increase in environmental impacts as compared to the previously certificated project. Conditions 50, 51, 52, and 53 of the Original Certificate, as modified by the 14-1591-EL-BGA Application, adequately address the potential noise impact of the proposed Vestas V110 (2.2 MW) turbine model.

Shadow Flicker

Shadow flicker from wind turbines occurs when rotating wind turbine blades pass between the sun and the viewer at low solar elevation angles. Shadow flicker is generally experienced in areas near wind turbines where the distance between the viewer and blade is short enough that the glare from the sunlight is insufficient to conceal the blade. When the blades rotate, this shadow creates a visual effect with the sun known as shadow flicker.

Staff determined that rotor diameters, turbine hub height, and turbine locations for both the certificated and the proposed turbine model are the same, thereby resulting in similar probabilities for shadow flicker associated with this turbine model at both a 2.0 MW and a 2.2 MW capacity.

Therefore, in relation to shadow flicker impact, the proposed additional turbine model would not pose any material increase in environmental impacts as compared to the previously certificated project. Conditions 54 and 55 of the Original Certificate, as modified by the 14-1591-EL-BGA Application, adequately address the potential shadow flicker impact of the proposed turbine model.

Conclusion

Staff finds that the proposed addition of the turbine model at either the 80 m or 95 m hub height would not result in a change in the location of any turbine or associated facility. Additionally, Staff finds that the impacts associated with the proposed upgrade in turbine model capacity would not result in a material increase in environmental impact, as compared to the previously certificated project. Finally, Staff determines the proposal would not impact the Applicant's ability to comply with the conditions of the Original Certificate and the certificate granted in Case No. 14-1591-EL-BGA.

Recommended Findings

Staff recommends that the Board approve the application, provided that the certificate continues to include all conditions previously specified by the Board as applicable to this facility.

Recommended Condition

- (1) The Applicant shall adhere to all conditions of the Opinion, Order, and Certificate in Case No. 10-2865-EL-BGN and the Order on Certificate in Case No. 14-1591-EL-BGA.

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Summary: Staff Report of Investigation electronically filed by Mr. Matt Butler on behalf of Staff of OPSB